

RECORD OF DECISION

Site 19 – Small Arms Range 910

Naval Station Great Lakes, Illinois





SITE 19 – SMALL ARMS RANGE 910 NAVAL STATION GREAT LAKES, ILLINOIS



1.0 DECLARATION

This Record of Decision (ROD) presents the Selected Remedy for Site 19 – Small Arms Range 910, located at Naval Station Great Lakes, Great Lakes, Illinois (Figure 1-1). The Selected Remedy for addressing surface and subsurface soil at the site includes land use controls (LUCs). This ROD documents the final remedial action for this site and does not include or affect any of the other sites at the facility. This decision is based on and relies upon information contained in the entire Administrative Record file for the site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record has been considered and is relevant to the selection of the remedy.

FIGURE 1-1. SITE FACILITY MAP



The Site 19 remedial action was selected by the Navy, as the lead agency, in consultation with the Illinois Environmental Protection Agency (Illinois EPA), the support agency. The selected remedy is in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, Title 42 United States Code Sections (t) 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) §300, et seq. Site 19 is part of a comprehensive environmental investigation and cleanup program currently being performed at Naval Station Great Lakes under CERCLA authority. Naval Station Great Lakes is an active facility, and environmental investigations are funded under Environmental Restoration, Navy.

Site 19 has been included in several environmental investigations, including the base-wide **Initial Assessment Study** (IAS) in 1986. Site-specific investigations were performed at Site 19 between 1998 and 2012, just before and since the Recruit Training Center Rifle Range in Building 910 at Naval Station Great Lakes was demolished. These investigations included:

- **Pre Demolition Hazardous Materials Investigation, Building 910**, (Cape Environmental Management, Inc., 1998).
- **Remedial Investigation and Risk Assessment (RI/RA) Report for Site 19 – Small Arms Range 910**, (TtNUS, 2010).
- **Focused Feasibility Study (FFS) for Small Arms Range 910**, (Tetra Tech, 2012).

There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to Site 19.

The Selected Remedy is protective of human health and the environment from the potential exposure to the contaminated soil through the use of LUCs. The Selected Remedy will not adversely impact the current and anticipated future land use of the site as an open, grassy area.

1.1 SELECTED REMEDY

The response action selected in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from this site which may present an imminent and substantial endangerment to public health or welfare. A CERCLA action is required because contaminants of concern (COCs) will remain at the site at concentrations greater than allowed for unlimited use and unlimited exposure. Additionally, unacceptable human health risks were identified under hypothetical future land use scenarios from exposure to COCs in media at the site. The Selected Remedy for Site 19 consists of the following:

- Incorporation of LUCs into the Base Master Plan (which already restricts groundwater and surface water use) to also restrict disturbance of surface and subsurface soil, and to prohibit residential development.
- Implementation of Five-Year Reviews to make sure that LUCs remain protective of human health.

The Selected Remedy (Alternative 2 – LUCs) will utilize LUCs to eliminate unacceptable risk associated with potential future exposure to site surface and subsurface soil and associated COCs, arsenic and manganese.

The Selected Remedy was chosen to meet the Remedial Action Objective (RAO) based on the evaluation of site conditions, site-related risks, anticipated future land use, and applicable or relevant and appropriate requirements (ARARs). The Selected Remedy is protective of human health and the environment, is cost-effective, and utilizes permanent solutions to the maximum extent practicable. It is also expected to achieve substantial long-term risk reduction and allow the property to be used for current and reasonably anticipated future land use. The site is a 0.67-acre open parcel covered with grass; it was determined that environmental impact is minimal since it is not an environmentally sensitive location or preferred habitat.

No source materials constituting **principal threat wastes**, as defined by United State Environmental Protection Agency (USEPA), are present at the site, and the lack of treatment was deemed appropriate. Because the Selected Remedy will result in impacted media remaining on site, LUCs will be instituted to make sure the RAO is achieved by limiting site use to non-residential activities and limiting excavation or disturbance of surface and subsurface soil without appropriate safety precautions. This remedy will result in hazardous substances remaining on site at levels that do not allow for unlimited use and unrestricted exposure; therefore, in accordance with Section 121(c) of CERCLA and NCP §300.430(f)(5)(iii)(c), a statutory review will be conducted within 5 years of initiation of remedial action, and every 5 years thereafter, to make sure that the remedy continues to be protective of human health and the environment.

1.2 DATA CERTIFICATION CHECKLIST

The data included in this ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for Naval Station Great Lakes.

TABLE 1-1. ROD DATA CERTIFICATION CHECKLIST	
DATA	LOCATION IN ROD
Chemicals of Concern (COCs) and their respective concentrations	Sections 2.3 and 2.5
Baseline risk represented by the COCs	Section 2.5
Cleanup objectives established for COCs and the basis for these levels	Section 2.7
How source materials constituting principal threats are addressed	Section 2.6
Current and reasonably anticipated future land use assumptions used in the risk assessment	Section 2.4
Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy	Section 2.9.3
Estimated capital and net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected	Section 2.8.1
Key factors that led to the selection of the remedy	Section 2.9.1

If contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD, the Navy will undertake necessary actions to continue to protect human health and the environment.

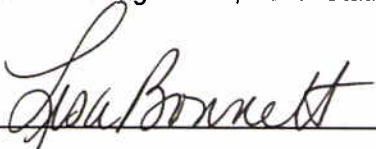
1.3 AUTHORIZING SIGNATURES



W. A. Bulis, Captain, United States Navy
Commanding Officer, Naval Station Great Lakes

6 FEB 2014

Date



Lisa Bonnett, Director, Illinois EPA

4/17/14

Date

2.0 DECISION SUMMARY

2.1 SITE DESCRIPTION AND HISTORY

Naval Station Great Lakes is located in Lake County, Great Lakes, Illinois, along the shore of Lake Michigan. The majority of Naval Station Great Lakes activities occur on a plateau atop a steep bluff that rises 70 feet above the beach along Lake Michigan. The facilities at Naval Station Great Lakes are used to support naval training and consist of the Recruit Training Command, Training Support Center, and Naval Facilities Engineering Command (NAVFAC) Midwest.

Site 19 - Small Arms Range 910 operated between 1942 and 1997 as a recruit training center indoor rifle range. It is estimated that 19 million pounds of ammunition were spent during its years of operation. Chemical solvents used at the rifle range included CLP brand cleaner and standard issue bore cleaner #6850-00-224-6663. Between the spent ammunition and cleaners, there was potential for impact from lead, volatile organic compounds (VOCs), and carcinogenic and non-carcinogenic polynuclear aromatic hydrocarbons (PAHs) in site media.

The building was demolished in 2000. The site is currently open space covered with grass, is approximately 0.67 acres in size, and is located within the Recruit Training Command Area (Figure 2-1).

FIGURE 2-1. AERIAL PHOTOGRAPHS OF SITE 19 FROM 2000 (LEFT) AND 2008 (RIGHT)



2.2 PREVIOUS INVESTIGATIONS

Table 2-1 provides brief summaries of previous investigations performed at Site 19. The nature and extent of the chemicals of potential concern (COPCs) in the various media at the site are discussed in Section 2.3. **Data collected** as part of the Site 19 2010 RI/RA and the 2012 FFS were both used to assess human health risks under various current and future end-use scenarios.

TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION

INVESTIGATION	DATE	ACTIVITIES
Initial Assessment Study	1986	Included review of historical records and aerial photographs, field inspections, and personnel interviews to evaluate the potential for environmental impacts at numerous sites across the base. Site 19 was identified as an area where further investigation was recommended to confirm or refute the presence of suspected contamination.
Pre Demolition Hazardous Materials Investigation	1998	Included a lead-based paint, asbestos-containing material, demolition waste, and polychlorinated biphenyl survey of the building materials, and the sampling and analysis of lead dust, sand, and soil of Building 910 and its contents prior to demolition
Remedial Investigation/Risk Assessment, Site 19 – Small Arms Range 910	2010	Included surface and subsurface soil sampling, installation and sampling of temporary monitoring wells, and aquifer testing of the temporary monitoring wells. One foot of fill material had been placed on the surface, based on available information; therefore, surface soil samples were separated into Native and Fill categories. Seven temporary wells were drilled at Site 19 but only two were producing after 2 days. The nonproducing wells were grouted and abandoned. Twenty soil borings were advanced. Sixteen surface soil samples were collected from 15 locations, and 22 subsurface soil samples were collected from 18 borings. COPCs were detected at concentrations less than human health screening criteria in groundwater. COPCs exceeding human health screening criteria were detected in surface and subsurface soil. A Risk Assessment was performed using data from the Site 19 RI. The results are discussed in Section 2.5.
Focused Feasibility Study	2012	Evaluated alternatives, including No Action, LUCs, and Excavation and Disposal, to eliminate unacceptable risks associated with contaminated media.

2.3 SITE CHARACTERISTICS

Physical Characteristics

Site 19 is a 0.67-acre lot bounded on the north by 4th Avenue, on the east by Ohio Street, and on the south and west by grass and concrete associated with other buildings (Figure 2-1). The site is currently open space covered with grass (Figure 2-2).

The topography of Site 19 is relatively flat with a gentle slope to the east toward Lake Michigan. The site is on a plateau with elevations ranging from 640 to 660 feet above mean sea level.

The **soil types** that form the plateau include Morley, Aptakisic, Wauconda, Beecher, and silt loams. Soil in this area is characterized as well-drained to poorly-drained with slow to moderate permeability. Surface and subsurface materials at Site 19 were characterized during the RI field investigation based on core samples collected from soil and well borings.

The shallow subsurface lithology of Site 19 comprises predominantly brown silty clay grading to gray clay, with occasional interbeds of gravel, sand, or silt from approximately 1 to 4 feet below ground surface (bgs). Typically, fill material is found above the clay. A sand layer was found from approximately 2 to 10 feet below the surface and on top of the clay in the southwest portion of the site.

The shallow aquifer was characterized at Site 19. The top of the shallow aquifer ranges from approximately 5.5 to 7.5 feet bgs, and is composed primarily of unconsolidated silty clays to clays and minor silts with discontinuous sand and gravel lenses interspersed throughout. It was determined from the unsuccessful attempts made to complete groundwater wells from borings, that the water encountered in these lenses is perched and not found in sufficient quantity to sustain a permanent monitoring well.

FIGURE 2-2. SITE 19



Nature and Extent of Contamination

The primary contaminant source at Site 19 is assumed to be the former indoor rifle range. It is estimated that 340,000 rounds of small arms ammunition were spent per year at the range. Spent ammunition was collected from the floor and removed once every 2 or 3 months. An estimated 19 million pounds of spent ammunition were generated by this facility, providing the potential for lead to have impacted site soil and groundwater.

Chemicals used at the rifle range include CLP brand cleaner and standard issue bore cleaner #6850-00-224-6663. These cleaners are primarily composed of petroleum products and distillates (VOCs and PAHs). The cleaners were used on rags, which were reused as long as possible. The rags were disposed of, along with the containers, in facility dumpsters. The use of these chemicals provided the potential for VOC and carcinogenic and non-carcinogenic PAH impact in site soil and groundwater.

The following summarizes the nature and extent of **contamination in the site media**, as encountered during the RI/RA site investigation:

Groundwater – Two monitoring wells were installed and sampled at Site 19. No contaminants were identified at concentrations greater than federal or state drinking water standards. The limited nature of contaminant concentrations in groundwater indicates that potential leaching of contaminants from soil to groundwater is not a significant concern at the site. Figure 2-3 shows the active monitoring well locations and detections.

- VOCs were detected in groundwater at concentrations less than risk-based screening levels and did not exceed regulatory criteria based on the **Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Groundwater Remediation Objectives** and **federal Maximum Contaminant Levels (MCLs)**.

- Low concentration carcinogenic and non-carcinogenic PAHs, including but not limited to, benzo(a)anthracene, benzo(a)pyrene (BaP), and dibenzo(a,h)anthracene, were detected in shallow

FIGURE 2-3. MONITORING WELL LOCATIONS



groundwater but did not exceed regulatory criteria based on Illinois EPA TACO Tier 1 Groundwater Remediation Objectives and federal MCLs.

- Arsenic was detected at concentrations greater than a non-regulatory screening level in one of the two wells; however, the concentration detected was well below the Illinois EPA TACO Tier 1 Groundwater Remediation Objective and the federal MCL.

Surface soil – Sixteen surface soil samples (plus two duplicate samples) were collected from 15 surface soil sample locations.

- Two VOCs (2-butanone and acetone) were detected in surface soil; however, no detections exceeded risk-based screening or regulatory criteria based on [Illinois EPA TACO Tier 1 Soil Remediation Objectives for Residential Incidental Ingestion](#). The presence of acetone in the samples could be attributed to laboratory contamination.
- Multiple carcinogenic and non-carcinogenic PAHs, including but not limited to benzo(a)anthracene, BaP, benzo(b)fluoranthene, and dibenzo(a,h)anthracene, were consistently detected in surface soil across the site. PAH concentrations exceeded screening criteria and Illinois EPA TACO Tier 1 Soil Remediation Objectives for Residential Incidental Ingestion, but were less than background concentrations established by the Illinois EPA for soil in counties within the Metropolitan Statistical Area.
- Inorganics (including arsenic and manganese) were detected in surface soil at concentrations greater than risk-based screening levels and Illinois EPA TACO Tier 1 Soil Remediation Objectives for Residential Incidental Ingestion but concentrations were acceptable for commercial/industrial use.

Subsurface soil – Twenty-two subsurface soil samples, plus one duplicate, were collected from 18 soil borings.

- Three VOCs (4-methyl-2-pentanone, trichlorofluoromethane, and acetone) were detected in subsurface soil. No detections exceeded risk-based screening or regulatory criteria based on Illinois EPA TACO Tier 1 Soil Remediation Objectives.
- Multiple carcinogenic and non-carcinogenic PAHs, including but not limited to, benzo(a)anthracene, BaP, and benzo(b)fluoranthene, were observed consistently at low concentrations in subsurface soil across the site. Concentrations of BaP exceeded risk-based screening levels. However, no subsurface concentrations exceeded Illinois EPA TACO Tier 1 Soil Remediation Objectives.
- Inorganics, including arsenic and manganese, were observed in subsurface soil at concentrations greater than risk-based screening levels and Illinois EPA TACO Tier 1 Soil Remediation Objectives for Residential Incidental Ingestions but less than the screening criteria for commercial/industrial exposure. Figure 2-4 shows these exceedances.

During the Site 19 RI, a limited number of VOCs were detected in soil at concentrations below the minimum screening criteria. Carcinogenic and non-carcinogenic PAH exceedances did not appear to be confined to a particular area of the site, and were less than background concentrations for the Metropolitan Statistical Area. Lead risk assessment results, based on the Integrated Exposure Uptake Biokinetic Model, estimate a 0.14 percent chance that any child will have a blood lead value greater than 10 micrograms per deciliter ($\mu\text{g}/\text{DL}$), which is less than the USEPA acceptable target of 5 percent. The adult model indicates that the estimated blood lead levels for construction and maintenance/occupational workers and their fetuses were also less than the established 10 $\mu\text{g}/\text{DL}$ standard. The average arsenic concentration was less than the Illinois EPA background level of 13 milligrams per kilogram (mg/kg) for both surface and subsurface soil. The average manganese concentration in both surface and subsurface soil was less than the background level of 1600 mg/kg .

No further investigation was recommended based on results of the RI.

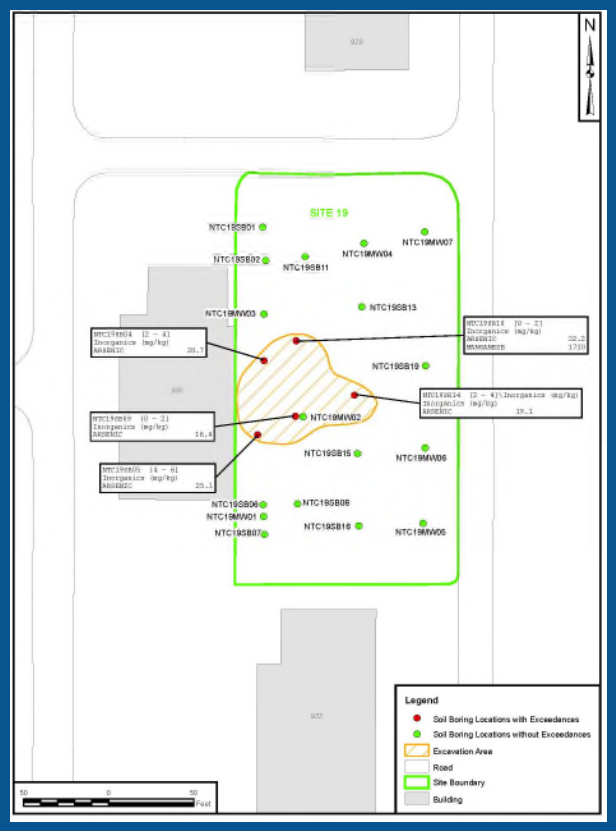
2.4 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Naval Station Great Lakes is an active Navy facility and is expected to remain active for the foreseeable future. The location of the site is within the Recruit Training Command Area. Naval Station Great Lakes is the only Navy recruit training facility; therefore, land use is unlikely to change.

It is anticipated that Site 19's use as an open grassy area will continue. Properties immediately adjacent to the site boundaries are generally commercial, industrial, or open space. Although not adjacent to the site, there are residential areas within 1/8 mile of the northern, eastern, and southern site boundaries. Future use of the surrounding land is unknown but is anticipated to remain the same.

In accordance with Naval Station Great Lakes [Instruction 11130.1](#) dated September 29, 2003, use of groundwater and surface water runoff within all geographical areas of the base, for any purpose, is strictly prohibited without prior written approval. Groundwater underlying Naval Station Great Lakes is not used for drinking water, and is not expected to be used as a water supply in the future. Drinking water for the base and residents of the surrounding communities is supplied from municipal systems drawing water from Lake Michigan. Additionally, the shallow aquifer below Site 19 would serve as a poor water supply source because it is not sufficiently productive to provide a consistent long-term source of water. If actual future land use at the site differs from what is anticipated, the Navy will reassess the associated risks.

FIGURE 2-4. SOIL SAMPLES WITH INORGANIC EXCEEDANCES



2.5 SUMMARY OF SITE RISKS

The baseline Human Health Risk Assessment (HHRA) characterizes and quantifies potential health risks based on the assumption that no actions are taken to control contaminant releases. The HHRA at Site 19 was based on the data for surface and subsurface soil and groundwater collected in the study area.

Results of the assessment are provided below.

Ecological risks do not exist at the site; therefore, no ecological risk assessment was performed.

2.5.1 Summary of Human Health Risk

A **quantitative HHRA** was performed for the site to characterize the potential risks to likely human receptors under current and potential future land uses. COPCs that contributed to unacceptable risk through this process were identified as COCs.

COPCs were identified by comparing maximum chemical concentrations in various media to their respective established regulatory screening values. In all cases, if the maximum concentration of a constituent exceeded any of these criteria, and was also greater than the background soil concentration,

the chemical was selected as a COPC and carried through to the quantitative risk assessment for the respective medium.

Screening values for surface and subsurface soil included the following:

- **Illinois EPA Tier 1 Soil Remediation Objectives (TACO) (2007).** These include remediation objectives for the soil ingestion exposure route and inhalation exposure route. The lowest Tier 1 objective for the receptors listed in the Tier 1 Tables (i.e., residential, industrial/commercial, or construction worker) was used for screening.
- **Revisions/Additions to Tables for Non-TACO Chemical Remediation Objectives (Illinois EPA, 2008).**
- Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (Illinois EPA, 2007).
- Soil Remediation Objectives for Industrial/Commercial Properties, Non-TACO Chemicals (Illinois EPA, 2007).
- **Oakridge National Laboratory Regional Screening Levels online at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.**
- **USEPA Generic Soil Screening Levels for inhalation of volatiles and fugitive dusts calculated online at http://rais.ornl.gov/calc_start.shtml based on methodology from the USEPA's Soil Screening Guidance (USEPA, 1996 and 2002).**
- **Illinois EPA Tier 1 Soil Remediation Objectives for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class 1 Groundwater (2007).**
- **USEPA Generic Soil Screening Levels for migration from soil to groundwater based on methodology from USEPA's Soil Screening Guidance (1996 and 2002).**

Although site groundwater is not a source of drinking water, the following screening criteria were conservatively used to select COPCs for groundwater:

- **Illinois EPA Tier 1 Groundwater Remediation Objectives for Class 1 Groundwater (2007).**
- **Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites online at http://epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.**
- **USEPA MCLs.**
- **USEPA Groundwater Screening Levels for Evaluating the Vapor Intrusion to Indoor Air (2002).**

The exposure assessment evaluated current and potential future exposure pathways through which humans might come in contact with the COPCs (as identified in the previous step). The results of the exposure assessment were used to refine the conceptual site model (CSM) (Figure 2-5), which identifies potential contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. Complete and potentially complete exposure pathways are also indicated on the CSM. Potential exposure routes for surface and subsurface soil and groundwater include incidental ingestion (swallowing small amounts), dermal contact (skin exposure), and/or inhalation (breathing) of airborne particulates. Potential receptors under current land use are maintenance workers, adolescent trespassers, and occupational workers. Potential receptors under future land use are construction/excavation workers, occupational workers, and hypothetical child and adult residents. Although the site is not likely to be developed for residential use, potential future residential receptors were evaluated in the HHRA, primarily for decision-making purposes.

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs, and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COPC. Based on the quantitative dose-response relationships determined, toxicity values for both cancer [cancer slope factor (CSF)] and non-cancer [reference dose (RfD)] effects were derived and used to estimate the potential for adverse effects.

Potential cancer and non-cancer risks were calculated based on reasonable maximum exposure (RME) and central tendency exposure (CTE) assumptions under various land uses. The RME scenario assumes the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumes average or median level of human exposure. The Illinois EPA goal for carcinogenic risks, as specified in TACO, is 1×10^{-6} , and USEPA's generally acceptable cancer risk range is 1×10^{-4} to 1×10^{-6} . The Illinois and USEPA non-cancer risk threshold is a hazard quotient (HQ) of 1 for individual COCs. A Hazard Index (HI) is generated by adding the HQs for COCs that affect the same target organ (e.g., liver) or are associated with the same exposure pathway. An HI greater than 1 indicates that site-related exposures may present a risk to human health. Quantitative estimates of non-cancer and cancer risks were developed for each receptor for exposure to COCs in each impacted medium under both RME and CTE scenarios (Table 2-2).

In summary, RME and CTE cancer risk estimates from exposure to surface and subsurface soil for construction workers, maintenance workers, occupational workers, trespassers, future child residents, and future adults residents, and the CTE cancer risk estimate for total future residential risk (child + adult) for Site 19 do not exceed the target USEPA cancer risk range (1×10^{-4} to 1×10^{-6}). However, RME and CTE cancer risk estimates from exposure to surface and subsurface soil for maintenance workers, occupational workers, future child residents, and future adults residents and the CTE cancer risk estimate for total future residents (child + adult) exceed the Illinois EPA risk goal (1×10^{-6}).

The total (soil + groundwater) site RME cancer risk estimates for total future residents (adult + child), exceed the USEPA cancer risk range (1×10^{-4} to 1×10^{-6}) and Illinois EPA risk goal (1×10^{-6}). The major contributors to cancer risk at Site 19 are arsenic and PAHs (benzo(a)anthracene, BaP, benzo(b)fluoranthene, chrysene, and dibenzo(a,h)anthracene).

No chemicals in soil were eliminated as COCs on the basis of comparisons to background concentrations. The PAHs selected as COCs (benzo(a)anthracene, BaP, benzo(b)fluoranthene, chrysene, and dibenzo(a,h)anthracene) in exposed surface soil had maximum detected concentrations that did not exceed surface soil background data. Based on this information and the Illinois EPA determination of urban PAH background concentrations, it is possible that these PAHs could be attributed to background conditions, and inclusion of these chemicals as COCs may result in an overestimation of total risks for this site.

The inorganic contaminants, arsenic and manganese, were also retained as COCs. The average arsenic concentrations were less than the Illinois EPA background level of 13 mg/kg for both surface and subsurface soil. Average concentrations of manganese in both surface and subsurface soil were less than the Illinois TACO Residential Criteria but greater than the background screening level.

There is no complete exposure pathway for groundwater exposure and no COC concentrations were identified at concentrations above federal or state drinking water standards. It was determined through the Site 19 RA that groundwater does not present a risk to current or future potential receptors.

2.5.2 Summary of Ecological Risk

Exposure of ecological receptors to site contaminants is expected to be minor based on the industrial nature of the site and lack of suitable habitat. Therefore, it was not necessary to evaluate potential risks to ecological receptors at the site.

2.5.3 Basis for Action

Relatively small but unacceptable human health risks were identified under current and potential future land use scenarios from exposure to arsenic, manganese, and PAHs in soil. Carcinogenic and non-carcinogenic PAH concentrations exceeded TACO Tier 1 Soil Remediation Objectives but were less than soil background levels for the Metropolitan Statistical Area. Based on the [Illinois EPA Summary of Selected Background Conditions for Inorganics in Soil study](#), it is possible that the arsenic and

manganese concentrations could also be attributed to background. Because risks were identified, a response action is necessary to protect the public health, welfare, and the environment from actual or threatened releases of hazardous substances, pollutants, and contaminants into the environment.

2.6 PRINCIPAL THREAT WASTES

The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are hazardous or highly toxic source materials that result in ongoing contamination to surrounding media, which generally cannot be reliably contained, or present a significant risk to human health or the environment should exposure occur. A source material includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air; or acts as a source for direct exposure.

A current source of contamination is not present at Site 19. The presence of contaminants in surface and subsurface soil is the result of past activities. While contaminants are present in soil, average concentrations do not exceed background. Therefore, principal threat wastes are not present at Site 19.

2.7 REMEDIAL ACTION OBJECTIVES

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs generally specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup goals) for a site, and provide a general description of what the cleanup will accomplish. The following RAO was developed for the site to address protection of human health and the environment:

RAO 1: Prevent unacceptable human health risk to hypothetical future residents associated with exposure to soil containing arsenic and manganese at concentrations greater than background and Illinois EPA TACO screening levels.

2.8 DESCRIPTION AND COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

General response actions (GRAs) are broadly defined remedial approaches that may be used (by themselves or in combination with others) to attain the RAOs. Because the HHRA identified potential non-carcinogenic risks at a concentration in excess of the HI of 1 and carcinogenic risks in excess of 1×10^{-4} , NAVFAC Midwest has developed three GRAs for Site 19:

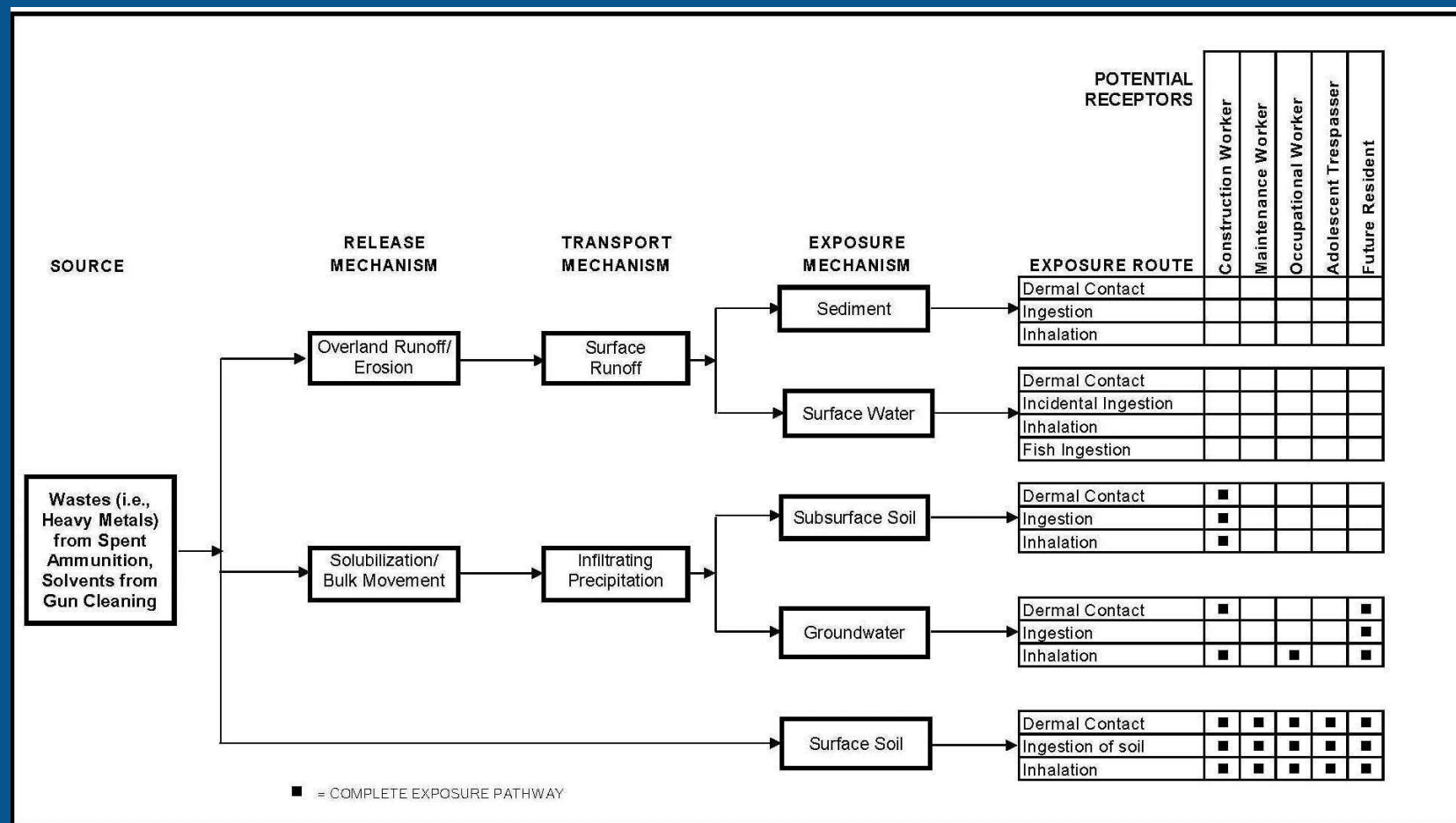
- No Action
- Limited Action (LUCs)
- Excavation and Disposal of Contaminated Soil

The most conservative of the Illinois EPA TACO Tier 1 Soil Remediation Objectives for residential, industrial/commercial, and construction worker exposure via incidental ingestion and inhalation were used to identify target concentrations for consideration of unrestricted use of the property. Target concentrations of PAHs and inorganics also took background concentrations into consideration, with background concentrations as defined in the [TACO Appendix A Table G for Inorganics and Appendix A Table H for PAHs](#).

The GRAs to be used at Site 19 are presented in Table 2-3.

Subsequently, the comparative analysis of remedial alternatives for the site performed in the FFS was limited to two options, LUCs and excavation; consistent with the NCP, the no action alternative was evaluated for baseline comparison only.

FIGURE 2-5. CONCEPTUAL SITE MODEL



Blank space indicates incomplete exposure pathway or relatively insignificant or not applicable potential exposure.

TABLE 2-2. SUMMARY OF CANCER RISKS AND HAZARD INDICES CTE/RME

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Construction/Excavation Worker	Surface Soil	Ingestion	2.E-07	8.E-08	--	--	--	0.5	0.3	--
		Dermal Contact	3.E-08	9.E-09	--	--	--	0.01	0.005	--
		Inhalation	6.E-09	3.E-09	--	--	--	0.05	0.02	--
		Total	2.E-07	9.E-08	--	--	--	0.6	0.3	--
	Subsurface Soil	Ingestion	1.E-07	5.E-08	--	--	--	0.4	0.2	--
		Dermal Contact	9.E-09	3.E-09	--	--	--	0.01	0.004	--
		Inhalation	5.E-09	3.E-09	--	--	--	0.04	0.02	--
		Total	1.E-07	6.E-08	--	--	--	0.5	0.2	--
	Groundwater	Ingestion	NA	NA	--	--	--	NA	NA	--
		Dermal Contact	1.E-09	5.E-10	--	--	--	0.001	0.0007	--
		Total	1.E-09	5.E-10	--	--	--	0.001	0.0007	--
Total Surface Soil			2.E-07	9.E-08	--	--	--	0.6	0.3	--
Total Subsurface Soil			1.E-07	6.E-08	--	--	--	0.5	0.2	--
Total Groundwater			1.E-09	5.E-10	--	--	--	0.001	0.0007	--
Total Across the Entire Site			3.E-07	1.E-07	--	--	--	1	0.5	--

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Maintenance Worker	Surface Soil	Ingestion	1.E-05	2.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
		Dermal Contact	4.E-06	1.E-07	--	--	cPAHs	0.009	0.0008	--
		Total	1.E-05	2.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
	Total Surface Soil		1.E-05	2.E-06	--	--	--	0.2	0.07	--
Total Across the Entire Site			1.E-05	2.E-06	--	--	--	0.2	0.1	--

TABLE 2-2. SUMMARY OF CANCER RISKS AND HAZARD INDICES CTE/RME

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Occupational Worker	Surface Soil	Ingestion	1.E-05	2.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
		Dermal Contact	4.E-06	1.E+07	--	--	cPAHs	0.009	0.0008	--
		Total	1.E-05	2.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
	Total Surface Soil		1.E-05	2.E-06	--	--	--	0.2	0.07	--
Total Across the Entire Site			1.E-05	2.E-06	--	--	--	0.2	0.1	--

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Adolescent Trespasser	Surface Soil	Ingestion	1.E-06	2.E-07	--	--	--	0.03	0.007	--
		Dermal Contact	6.E-07	2.E-08	--	--	--	0.002	0.0002	--
		Total	2.E-06	2.E-07	--	--	--	0.03	0.007	--
	Total Surface Soil		2.E-06	2.E-07	--	--	--	0.03	0.007	--
Total Across the Entire Site			2.E-06	2.E-07	--	--	--	0.03	0.01	--

TABLE 2-2. SUMMARY OF CANCER RISKS AND HAZARD INDICES CTE/RME

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Future Child Resident	Surface Soil	Ingestion	7.E-05	4.E-06	--	cPAHs, Arsenic	--	2	0.7	--
		Dermal Contact	2.E-05	2.E-07	--	cPAHs	Arsenic	0.05	0.007	--
		Total	8.E-05	4.E-06	--	cPAHs, Arsenic	--	2	0.7	--
	Groundwater	Ingestion	5.E-05	4.E-06	--	Arsenic	cPAHs	1.1	0.09	--
		Dermal Contact	6.E-08	1.E-08	--	--	--	0.002	0.0002	--
		Total	5.E-05	4.E-06	--	Arsenic	cPAHs	1.1	0.09	--
	Total Surface Soil		8.E-05	4.E-06	--	--	--	2	0.7	--
	Total Groundwater		5.E-05	4.E-06	--	--	--	1.1	0.09	--
	Total Across the Entire Site		1.E-04	8.E-06	--	--	--	3	0.8	--

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Future Adult Resident	Surface Soil	Ingestion	2.E-05	1.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
		Dermal Contact	4.E-06	8.E-06	--	--	cPAHs	0.008	0.0008	--
		Total	2.E-05	1.E-06	--	--	cPAHs, Arsenic	0.2	0.07	--
	Groundwater	Ingestion	5.E-05	7.E-06	--	Arsenic	cPAHs	0.3	0.1	--
		Dermal Contact	1.E-07	2.E-08	--	--	--	0.0009	0.0005	--
		Total	5.E-05	7.E-06	--	Arsenic	cPAHs	0.3	0.1	--
	Total Surface Soil		2.E-05	1.E-06	--	--	--	0.2	0.07	--
	Total Groundwater		5.E-05	7.E-06	--	--	--	0.3	0.1	--
	Total Across the Entire Site		7.E-05	8.E-06	--	--	--	0.5	0.2	--

TABLE 2-2. SUMMARY OF CANCER RISKS AND HAZARD INDICES CTE/RME

Receptor	Medium	Exposure Route	Cancer Risk RME	Cancer Risk CTE	Chemicals with Cancer Risks > 1E-4	Chemicals with Cancer Risks > 1E-5 and < 1E-4	Chemicals with Cancer Risks > 1E-6 and < 1E-5	Hazard Index (HI) RME	Hazard Index (HI) CTE	Chemicals with HI > 1
Total Residential Risks	Surface Soil	Ingestion	8.E-05	5.E-06	--	cPAHs, Arsenic	--	NA	NA	--
		Dermal Contact	2.E-05	3.E-07	--	cPAHs	Arsenic	NA	NA	--
		Total	1.E-04	5.E-06	--	cPAHs, Arsenic	--	NA	NA	--
	Groundwater	Ingestion	1.E-04	1.E-05	--	cPAHs, Arsenic	--	NA	NA	--
		Dermal Contact	2.E-07	3.E-08	--	--	--	NA	NA	--
		Total	1.E-04	1.E-05	--	cPAHs, Arsenic	--	NA	NA	--
	Total Surface Soil		1.E-04	5.E-06	--	--	--	NA	NA	--
	Total Groundwater		1.E-04	1.E-05	--	--	--	NA	NA	--
	Total Across the Entire Site		2.E-04	2.E-05	--	--	--	NA	NA	--

cPAHs = Carcinogenic PAHs

NA = Not applicable

TABLE 2-3. GENERAL RESPONSE ACTIONS		
GENERAL RESPONSE ACTION	TECHNOLOGY	PROCESS OPTIONS
No Action	None	Not applicable.
Limited Action (LUCs)	Institutional Controls	Legal restrictions on land use and site excavations.
Excavation and Disposal	Excavation and removal of site soil	Excavation of contaminated soil using heavy equipment and disposal at a nonhazardous waste facility.

2.8.1 Description of Remedial Alternatives

Table 2-4 describes the major components of the alternatives evaluated and provides associated costs.

TABLE 2-4. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED			
ALTERNATIVE	COMPONENTS	DETAILS	COST
Alternative 1: No Action No action to address surface and subsurface soil or risks from potential contact.	None	No action	No cost
Alternative 2: LUCs Includes restrictions on property development with site reviews every 5 years.	Institutional Controls	LUCs will restrict property use and development. The site will be restricted to industrial/commercial (non-sensitive) use. A basewide Memorandum of Agreement on groundwater use is already in place.	Capital Cost: \$23,000 Annual Cost: \$2,000 5-Year Cost: \$25,000 30-Year NPW: \$190,000 Discount rate: 2% Time frame: Some restrictions are already in place. Remaining LUCs will be easily implemented.
Alternative 3: Excavation and Disposal	Mechanical excavation	Mechanical excavation of the impacted soil would be performed using heavy equipment. Upon completion of excavation, the location would be backfilled with clean material and graded. Excavated material would be transported offsite for disposal in a non-hazardous landfill.	Capital Cost: \$385,000

2.8.2 Comparative Analysis of Remedial Alternatives

The three alternatives considered for Site 19 are shown in Table 2-4. The first was the No Action alternative, which does not meet the threshold criteria for selection, but is required by NCP for comparative purposes.

Alternatives 2 and 3 are both protective of human health. It was determined that, due to the location of Site 19 and lack of suitable habitat, ecological risks are not present.

Alternatives 2 and 3 comply with chemical-specific ARARs and to be considered (TBC) criteria by controlling exposure pathways and providing long-term effectiveness and permanence. Location-specific ARARs and TBCs are not applicable for either of these two alternatives. Action-specific ARARs and TBCs are not applicable for Alternative 2, and Alternative 3 would comply with action-specific ARARs and TBCs.

There would be no treatment with either of the two alternatives; therefore, there would be no reduction of contaminant toxicity, mobility, or volume through treatment. Alternative 2 would not result in short-term risks to workers, the community, or the environment while Alternative 3 has the potential to result in short-term risks to all three; however, engineering controls and compliance with health and safety procedures would minimize risks.

Both alternatives would achieve the RAO. Alternative 3 would involve greenhouse gas and pollutant emissions, as well as water and energy consumption, although the use of biodiesel fuel would reduce emissions.

Both alternatives are readily implementable. The 30-year NPW for Alternative 2 is less than half the total NPW of the removal activity of Alternative 3. Based on community acceptance, Alternative 2 was selected for Site 19. The Illinois EPA has indicated that Alternative 2 is acceptable. Section 2.9.4 discusses the statutory determinations and how the Selected Remedy meets the [nine CERCLA evaluation criteria](#).

2.9 SELECTED REMEDY

2.9.1 Rationale for Selected Remedy

The Selected Remedy for Site 19 consists of LUCs and annual inspections with a formal review every 5 years. This alternative was selected based on consideration of the requirements of CERCLA, the NCP, and input received from Illinois EPA. The remedy will meet the RAO by implementing LUCs to restrict future site use to non-residential. A basewide Memorandum of Agreement (MOA) is already in place to restrict groundwater use at Naval Station Great Lakes.

The principal factors considered in the selection of this remedy included the following:

- The remedy can be implemented in a relatively short time frame, will be protective of human health, is cost-effective, and will result in a permanent solution to the maximum extent practicable.
- The remedy is consistent with current and reasonably anticipated future use of the site.
- The remedy will reduce risk by continuing restrictions on groundwater use and property development.

2.9.2 Description of Selected Remedy

LUCs will be established at the site to make sure the property is not developed for residential or non-residential special use (such as for child-care facilities, pre-schools, elementary schools, secondary schools, playgrounds, convalescent, or nursing care facilities) by a population that requires special protections. The LUCs will be implemented and maintained by the Navy in perpetuity or until concentrations of hazardous substances in soil are at levels that allow for unrestricted use and unlimited exposure.

Five-Year Reviews will be required since contaminants will remain in soil at concentrations greater than levels acceptable for unrestricted use at the site.

The following generally describes LUCs that will be implemented at the site to achieve the LUC performance objectives:

- Preparation of a site plat describing the LUCs within the boundaries of the site and filing of the plat with NAVFAC Midwest's real estate division.
- Incorporation of these restrictions, in the form of a deed notice or lease notice, into any real estate property documents associated with future sale or lease of the site. The real estate property documents will also include a discussion of the status of the site and a description of the COCs in site media.
- Notification of Illinois EPA at least 6 months prior to any transfer, sale, or lease of any property subject to LUCs required by a decision document. This will enable Illinois EPA to be involved in discussions to make sure that appropriate provisions, such as the Illinois EPA's Uniform Environmental Covenants Act 765 Illinois Compiled Statutes 122 (an environmental covenant), are included in the conveyance documents to maintain effective LUCs. An environmental covenant will be required to be placed on the property, unless the site no longer contains hazardous substances in soil at levels that do not allow for unrestricted use and unlimited exposure.
- Annual inspections to make sure that there are no violations of these restrictions. The Installation Commander will provide annual certification to Illinois EPA that there have been no violations of these restrictions.
- If a violation of a restriction occurs, a description of the violation and the corrective actions to be taken to restore protectiveness will be reported immediately to Illinois EPA.

LUCs will be implemented and maintained by the Navy in perpetuity until concentrations of hazardous substances in site media are at levels that allow for unrestricted use and unlimited exposure. The Navy or any subsequent owners shall not modify, delete, or terminate any LUC without Illinois EPA concurrence. The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs described in this ROD. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for the remedy integrity. If the Navy transfers, sells, or leases the property, the Navy will be required to meet the requirements of Illinois EPA's Uniform Environmental Covenants Act 765 Illinois Compiled Statutes 122 (an environmental covenant).

Should any LUC remedy fail, the Navy will make sure that appropriate actions are taken to re-establish the remedy's protectiveness, and may initiate legal action to either compel action by a third party(ies) and/or to recover the Navy's costs for remediating any discovered LUC violation(s). The Navy will maintain, monitor, and enforce the LUCs according to the LUC MOA. LUCs will be developed in accordance with the [Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions](#), per letter dated October 2, 2003, from Raymond F. DuBois, Deputy Under Secretary of Defense (Installations and Environment), to Hon. Marianne Lamont Horinko, Acting Administrator, USEPA. Implementation of this remedy will require a survey of the site, annual visual inspections, and Five-Year Reviews with report preparation.

The sequence of actions for implementing the Selected Remedy is:

1. Institute LUCs and input the site into the LUC Tracker System.
2. Perform annual inspection and certification of the site.
3. Perform Five-Year Reviews.

2.9.3 Expected Outcomes of Selected Remedy

The current land use, as a grassy, vacant area, is expected to remain the same for the foreseeable future. Groundwater at the site is not used and is not expected to be used in the future, as an existing MOA prevents groundwater use. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the Selected Remedy. It is estimated that the RAO for Site 19 will be achieved upon implementation of the remedy. Table 2-5 describes how the Selected Remedy mitigates risks and achieves the RAO for the site.

Site use is not expected to change; therefore, modification or removal of the LUCs will not be required. However, if proposed land use changes in the future and other uses are expected, other remedial approaches may be required. Any modifications to LUCs will be conducted in accordance with provisions in the Base's LUC MOA.

TABLE 2-5. HOW THE SELECTED REMEDY MITIGATES RISKS AND ACHIEVES THE RAO

RAO	COMMENTS
Prevent unacceptable human health risk to hypothetical future residents associated with exposure to soil containing arsenic and manganese at concentrations greater than background and Illinois EPA TACO screening levels.	LUCs will place restrictions on land use, by restricting use to non-sensitive uses.

The Illinois EPA has indicated that the implementation of Alternative 2 is acceptable.

2.9.4 Statutory Determinations

In accordance with the NCP, Alternative 2, LUCs, the Selected Remedy, and Alternative 3, Excavation and Disposal, meet the following statutory determinations:

- **Protection of Human Health and the Environment** – Alternative 2, LUCs, will be protective of human health and the environment. Institutional controls will prevent future residential development of the site and eliminate exposure to site groundwater. Alternative 3, Excavation and Disposal, would be protective of human health and the environment in the long term by removing contaminated soil.
- **Compliance with ARARs** - ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. LUCs will comply with the applicable chemical-, location-, and action-specific ARARs. Federal and state ARARs are presented in the Appendix. Excavation and Disposal would also comply with applicable ARARs.
- **Long-Term Effectiveness and Permanence**. Although no treatment will be used, LUCs will remove the pathway for exposure by restricting access and activities at the site. Excavation and Disposal would be both effective for the long-term and permanent.
- **Reduction in Toxicity, Mobility, or Volume through Treatment**. Neither LUCs nor Excavation and Disposal utilize treatment to reduce the toxicity, mobility, or volume of hazardous substances.
- **Short-Term Effectiveness**. LUCs will not result in short-term risks nor will they adversely impact the surrounding community or the environment. Excavation and Disposal has the potential to result in short-term risks to workers, the community, or the environment; however, engineering controls and compliance with health and safety procedures would minimize risks.
- **Implementability**. LUCs are readily implementable. The resources required are currently available and the administrative aspects of this alternative will be relatively simple. Future deed restrictions will assure continued implementation of LUCs in the event there is a change in property ownership, and

LUCs will be reviewed annually to make sure proper maintenance and enforcement of administrative controls. The site will be added to the Naval Station Great Lakes LUC MOA through a LUC Implementation Plan. Excavation and Disposal are also readily implementable and the resources to perform these activities are available locally.

- **Cost.** The estimated NPW cost of LUCs is \$190,000. The estimated NPW cost of Excavation and Disposal is \$385,000.
- **State Acceptance.** State involvement has been solicited throughout the CERCLA process. Illinois EPA concurs with the Selected Remedy and also concurs that Alternative 3 is an acceptable remedy.
- **Community Acceptance.** No written questions, comments, or requests for a public meeting were received during the formal public comment period for the **Proposed Plan**.
- **Five-Year Review.** Because the Selected Remedy results in impacted media remaining on site and does not allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years of the initiation of the remedy and every 5 years thereafter to make sure that the remedy is, or will be, protective of human health and the environment. Alternative 3 removes impacted media at the site, allowing for unlimited use and unlimited exposure; therefore, Five-Year Reviews would not be necessary at Site 19.

2.10 COMMUNITY PARTICIPATION

The **Proposed Plan** for Site 19 (Tetra Tech, 2012) was released for public review and comment on June 21, 2013 by the Navy and Illinois EPA. In accordance with Sections 113 and 117 of CERCLA, a **public notice** was published on that date informing the community that the Proposed Plan was available for review at the Environmental Department at Naval Station Great Lakes. The public notice was published in the Great Lakes Bulletin and on the Public Notice Illinois/Illinois Press Association web site (<http://publicnoticeillinois.com/Details.aspx?SID=lfxbd4yvdsdo121fmer5bwgyb&ID=781906>). With the Public Notice, the Navy solicited comments on the Proposed Plan and provided the opportunity for interested parties to request a public meeting within a 30-day period ending July 22, 2013. No meeting requests or public comments were received.

The Naval Station Great Lakes Information Repository, which contains the Administrative Record for Site 19, is available to the public in the Environmental Department at Naval Station Great Lakes, Building 1A, located on 201 Decatur Avenue, Great Lakes, Illinois. Documents and other relevant information including investigation activities, results, and associated remedial decisions relied on in the remedy selection process are included in the Administrative Record. This ROD will become part of the Administrative Record File per NCP §300.825(a)(2). For access to the Administrative Record or additional information about the Installation Restoration Program at Naval Station Great Lakes, contact: Terese Van Donsel at (847) 688-2600, Extension 136. The Administrative Record can also be accessed online at: <http://go.usa.gov/RsJ>. From this website, just click on the “Administrative Record” tab, enter the Administrative Record, and search for “SITE 00019.”

2.11 EXPLANATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of significant changes from the Selected Remedy presented in the Proposed Plan that was published for public comment. Although the opportunity for a public meeting was provided as stated in the Navy’s public notice, none was requested, and no written comments, concerns, or questions were received by the Navy or Illinois EPA during the public comment period.

3.0 RESPONSIVENESS SUMMARY

The Navy released the Proposed Plan for Site 19 for public comment and encouraged public participation in the remedy selection process. There was no request for a public meeting nor were comments or questions received during the public comment period.

LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
BaP	Benzo(a)pyrene
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
FFS	Focused Feasibility Study
GRA	General Response Action
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IAS	Initial Assessment Study
Illinois EPA	Illinois Environmental Protection Agency
LUC	Land Use Control
MCL	Maximum Contaminant Level
mg/kg	Milligram per Kilogram
MOA	Memorandum of Agreement
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substance Pollution Contingency Plan (also called the National Contingency Plan)
NPW	Net Present Worth
PAH	Polynuclear Aromatic Hydrocarbon
PRG	Preliminary Remediation Goal
RAO	Remedial Action Objective
RfD	Reference Dose
RI/RA	Remedial Investigation/Risk Assessment
RME	Reasonable Maximum Exposure
ROD	Record of Decision
TACO	Tiered Approach to Corrective Action Objectives
TBC	To Be Considered
µg/DL	Microgram per Deciliter
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound



SITE 19 – SMALL ARMS RANGE 910 NAVAL STATION GREAT LAKES, ILLINOIS



DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD
1	Initial Assessment Study	Section 1.0 Page 1	Rogers, Golden & Halpern, 1986. Initial Assessment Study, Naval Complex Great Lakes, Illinois (page 5-13 bottom of page)
2	Pre Demolition Hazardous Materials Investigation	Section 1.0 Page 2	Cape Environmental Management, Inc., 1998. Pre Demolition Hazardous Materials Investigation, Building 910 (link to Cover Page)
3	Remedial Investigation and Risk Assessment	Section 1.0 Page 2	TtNUS, 2010. Remedial Investigation and Risk Assessment (RI/RA) Report for Site 19 – Small Arms Range 910 (link to Cover Page)
4	Focused Feasibility Study	Section 1.0 Page 2	Tetra Tech, 2012. Focused Feasibility Study (FFS) for Small Arms Range 910 (link to Cover Page)
5	principal threat wastes	Section 1.1 Page 2	USEPA, 1991. A Guide to Principal Threat and Low Level Threat Wastes. OSWER Directive 9380.3-06FS.6-03 (link to Cover Page)
6	Data collected	Section 2.2 Page 4	TtNUS, 2010. Remedial Investigation and Risk Assessment (RI/RA) Report for Site 19 – Small Arms Range 910 (link to Table 4-1)
7	soil types	Section 2.3 Page 5	TtNUS, 2010. Remedial Investigation and Risk Assessment (RI/RA) Report for Site 19 – Small Arms Range 910 (link to Section 2.2.3)
8	contamination in the site media	Section 2.3 Page 6	TtNUS, 2010. Remedial Investigation and Risk Assessment (RI/RA) Report for Site 19 – Small Arms Range 910 (link to Section 4)
9	Illinois EPA TACO Tier 1 Groundwater Remediation Objectives	Section 2.3 Page 6	TtNUS, 2010. Remedial Investigation and Risk Assessment Report for Site 19 – Small Arms Range 910 (link to Table 4-2)
10	federal MCLs	Section 2.3 Page 6	TtNUS, 2010. Remedial Investigation and Risk Assessment Report for Site 19 – Small Arms Range 910 (link to Table 4-2)

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD
11	Illinois EPA TACO Tier 1 Soil Remediation Objectives for Residential Incidental Ingestion	Section 2.3 Page 7	TtNUS, 2010. Remedial Investigation and Risk Assessment Report for Site 19 – Small Arms Range 910 (link to Table 4-4)
12	Instruction 11130.1	Section 2.4 Page 8	Navy, 2003. Ground Water Use Restrictions. NAVSTAGLAKESINST 11130.1. September 30. (link to page 1)
13	quantitative HHRA	Section 2.5.1 Page 8	TtNUS, 2010. Remedial Investigation and Risk Assessment Report for Site 19 – Small Arms Range 910 (link to Section 6)
14	Illinois EPA Tier 1 Soil Remediation Objectives (TACO) for Residential Properties	Section 2.5.1 Page 9	Illinois EPA, 2007. Tiered Approach to Corrective Action Objectives. http://www.ipcb.state.il.us/documents/dsw eb/Get/Document-38408 (link to page 147)
15	Revisions/Additions to Tables for Non-TACO Chemical Remediation Objectives	Section 2.5.1 Page 9	Illinois EPA, 2008. Tiered Approach to Corrective Action Objectives Amendment. 35 Ill. Adm. Code Part 742 (link to page 1)
16	Oakridge National Laboratory Regional Screening Levels	Section 2.5.1 Page 9	http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (link to page 1)
17	USEPA Generic Soil Screening Levels for inhalation of volatiles and fugitive dusts	Section 2.5.1 Page 9	http://rais.ornl.gov/calc_start.shtml (link to Cover Page)
18	Illinois EPA Tier 1 Soil Remediation Objectives for Residential Properties for the Soil Component of the Groundwater Ingestion Exposure Route for Class 1 Groundwater	Section 2.5.1 Page 9	Illinois EPA, 2007. Tiered Approach to Corrective Action Objectives. http://www.ipcb.state.il.us/documents/dsw eb/Get/Document-38408 (link to page 147 on pdf file)
19	USEPA Generic Soil Screening Levels for migration from soil to groundwater	Section 2.5.1 Page 9	USEPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. Office of Solid Waste and Emergency Response USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24 (link to page 1)

DETAILED ADMINISTRATIVE RECORD REFERENCE TABLE

ITEM	REFERENCE PHRASE IN ROD	LOCATION IN ROD	LOCATION OF INFORMATION IN ADMINISTRATIVE RECORD
20	Illinois EPA Tier 1 Groundwater Remediation Objectives for Class 1 Groundwater	Section 2.5.1 Page 9	Illinois EPA, 2007. Tiered Approach to Corrective Action Objectives. http://www.ipcb.state.il.us/documents/dsw eb/Get/Document-38408 (link to page 167)
21	Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites	Section 2.5.1 Page 9	http://epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm (link to page 1)
22	USEPA MCLs	Section 2.5.1 Page 9	USEPA, 2009. National Recommended Water Quality Criteria (link to page 1)
23	USEPA Groundwater Screening Levels for Evaluating the Vapor Intrusion to Indoor Air	Section 2.5.1 Page 9	USEPA, 2002a. Draft Guidance For Evaluating The Vapor Intrusion to Indoor Air Pathway From Groundwater And Soils (Subsurface Vapor Intrusion Guidance). Federal Register Volume 67, Number 230 (link to page 1)
24	Illinois EPA Summary of Selected Background Conditions for Inorganics in Soil study	Section 2.5.3 Page 10	Illinois EPA, 1994. A Summary of Selected Background Conditions of Inorganics in Soil. IEPA/ENV/94-161(link to page 1)
25	General response actions	Section 2.8 Page 11	Tetra Tech, 2012. Focused Feasibility Study (FFS) for Small Arms Range 910 (link to Section 2.2)
26	TACO Appendix A Table G for Inorganics and Appendix A Table H for PAHs	Section 2.8 Page 11	Illinois EPA, 2007. Tiered Approach to Corrective Action Objectives. http://www.ipcb.state.il.us/documents/dsw eb/Get/Document-38408 (link to page 120)
27	nine CERCLA evaluation criteria	Section 2.8.2 Page 18	Tetra Tech, 2012. Focused Feasibility Study (FFS) for Small Arms Range 910 (link to Section 4.1.1)
28	Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions	Section 2.9.2 Page 19	Navy, 2003. Principles and Procedures for Specifying, Monitoring, and Enforcement of Land Use Controls and Other Post-ROD Actions (link to page 1)
29	Proposed Plan	Section 2.9.4 Page 21	Tetra Tech, 2012. Proposed Plan for Small Arms Range 910 (link to page 1)
30	public notice	Section 2.10 Page 21	Lake County Journal (Great Lakes Bulletin) and the Public Notice Illinois/ Illinois Press Association web site, June 7, 2013 (link to page 1)

Appendix A

TABLE 1

**FEDERAL AND STATE CHEMICAL-SPECIFIC ARARS AND TBCS
SITE 19 RECORD OF DECISION
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS
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Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Federal				
Cancer Slope Factors (CSFs)	-	To Be Considered	These are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants. Slope factors are developed by EPA from health effects assessments. Carcinogenic effects present the most up-to-date information on cancer risk potency. Potency factors are developed by EPA from Health Effects Assessments of evaluation by the Carcinogenic Assessment Group.	Used to compute the individual incremental cancer risk resulting from exposure to carcinogenic contaminants in site media. Risks due to carcinogens as assessed with slope factors will be addressed excavation and off-site disposal and/or land use controls (LUCs).
Reference Doses (RfDs)	-	To Be Considered	Guidance used to compute human health hazard resulting from exposure to non-carcinogens in site media. RfDs are considered to be the levels unlikely to cause significant adverse health effects associated with a threshold mechanism of action in human exposure for a lifetime.	Used to calculate potential non-carcinogenic hazards caused by exposure to contaminants. Hazards due to non-carcinogens with EPA RfDs will be addressed excavation and off-site disposal and/or LUCs.
Guidelines for Carcinogen Risk Assessment	EPA/630/P-03/001F (March 2005)	To Be Considered	Guidance for assessing cancer risk.	Used to calculate potential carcinogenic risks caused by exposure to contaminants. Hazards due to carcinogens assessed through this guidance will be addressed excavation and off-site disposal and/or LUCs.

TABLE 1

**FEDERAL AND STATE CHEMICAL-SPECIFIC ARARS AND TBCS
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Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Federal (continued)				
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens	EPA/630/R-03/003F (March 2005)	To Be Considered	Guidance of assessing cancer risks to children.	Used to calculate potential carcinogenic risks to children caused by exposure to contaminants. Carcinogenic risks to children assessed through this guidance will be addressed excavation and off-site disposal and/or LUCs.
Regional Screening Levels for Chemical Contaminants at Superfund Sites for Residential and Industrial Receptors	USEPA Oak Ridge National Laboratory (2008)	To Be Considered	Chemical contaminant screening level guidance.	RSLs are used when a potential site is initially investigated to determine if potentially significant levels of contamination are present to warrant further investigation. Screening levels may be used during the initial scoping of remediation goals, but remediation goals are ultimately selected based on site-specific information. The RSL tables were not generated to represent action levels or cleanup levels.

TABLE 1

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State				
Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) - Tier 1 Soil Remediation Objectives	35 IAC 742.505 (a)(1) and (a)(2) - (Tier 1 Soil Remediation Objectives); 742.1012 - (Institutional Controls, Federally Owned Property); Section 742.Table G and Table H – Background Soil Concentrations	To Be Considered	This Part sets forth procedures for evaluating the risk to human health posed by environmental conditions and developing remediation objectives that achieve acceptable risk levels, and to provide for the adequate protection of human health and the environment based on the risks to human health posed by environmental conditions while incorporating site related information. A Tier 1 evaluation compares the concentration of contaminants detected at a site to the corresponding tabulated remediation objectives for residential and industrial/commercial properties.	These values were used to develop PRGs. Facility is in the Metropolitan Statistical Area where background values apply.

TABLE 2

**FEDERAL AND STATE LOCATION-SPECIFIC ARARS AND TBCS
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Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Federal				
There are no federal location-specific ARARs.				
State				
Coastal Zone Management	Illinois Coastal Management Program (ICMP) – Chapter 11, Federal Consistency and the National Interest	To Be Considered	On January 31, 2012, the ICMP received federal approval under the Coastal Zone Management Act (CZMA). The ICMP will work to preserve, protect, restore, and where possible, enhance coastal resources. The ICMP document identifies a framework of existing programs, laws, and policies that brings state agencies into a comprehensive network. The coastal zone is defined in the ICMP.	Regulations and policies that are included under the ICMP would be evaluated under the normal course of the CERCLA ARAR/TBC determination process. However, to make sure that possible ICMP enforceable policies are addressed, Illinois Department of Natural Resources (IDNR) will be consulted prior to the final selection of ARARs/TBCs.

TABLE 3

**FEDERAL AND STATE ACTION-SPECIFIC ARARS AND TBCS
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Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Federal				
There are no federal action-specific ARARs.				
State				
Identification and Listing of Hazardous Waste	35 IAC 721 Subparts C and D	Applicable	Identifies those solid wastes that are subject to regulation as hazardous wastes.	These regulations would apply when determining whether or not a solid waste, such as contaminated soil or purge water from monitoring wells, is hazardous, either by being listed or exhibiting a hazardous characteristic.
Standards Applicable to Generators of Hazardous Waste	35 IAC 722.111 and 722 Subpart C	Applicable	Characterization of waste is required to determine if it is a hazardous waste. Subpart C Establishes manifesting, pre-transport, and accumulation requirements for hazardous waste.	If contaminated soil or purge water from monitoring wells is determined to be hazardous, these regulations would apply.
Fugitive Particulate Dust	35 IAC 212 Subpart K	Applicable	No person shall cause or allow the emission of fugitive particulate matter from any process, including any material handling or storage activity that is visible by an observer looking generally toward the zenith at a point beyond the property line of the source.	Control of dust during excavation and handling of soil would be implemented to prevent material from becoming airborne.

TABLE 3

**FEDERAL AND STATE ACTION-SPECIFIC ARARS AND TBCS
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Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
State (continued)				
Illinois Urban Manual (2010)	None	To be considered	The standards and associated materials describe best management practices for controlling non-point source pollution impacts that affect ecosystems in existing communities and developing areas. The manual includes BMPs for soil erosion and sediment control; stormwater management; and special area protection.	Soil excavation activities would need to meet these requirements.
Illinois Solid Waste and Special Waste Hauling	35 IAC 809	Potentially Applicable	These regulations would apply if waste is transported to a disposal facility.	This regulation would apply if excavation and hauling was performed.